

Edward E.K. Baidoo
Lawrence Berkeley National Laboratory
Joint BioEnergy Institute
5885 Hollis St., 4th Floor
Emeryville, CA 94608, USA
Work: (510) 495-2420
Cell: (510) 219-1540
eebaidoo@lbl.gov

WORK INTERESTS

My work focuses on the use of metabolomic analyses to characterize engineered biosynthetic and metabolic pathways to understand primary and secondary cellular metabolism and their regulation, in vivo.

EXPERIENCE AND SKILLS

Mammalian and microbial cell culture growth, metabolite extraction and purification, GC-MS, HPLC-UV/Vis, HPLC-RI, LC-MS (Quad, Triple-Quad, Q-trap, TOF, QTOF and FT-ICR-MS), capillary electrophoresis (CE) with UV/diode array and conductivity detection, CE-MS (Quad, Triple-Quad, Q-trap, TOF, QTOF and FT-ICR-MS), metabolomics data analysis and interpretation.

WORK

- 2013–present **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**
Location: Joint BioEnergy Institute.
Position: Biochemist Research Scientist/Engineer
Research: Development of high resolution metabolomics platforms for pathway analysis and global metabolite research to understand the impact of engineered pathways on cellular metabolism in biotechnologically and environmentally relevant microorganisms.
- 2011–2013 **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**
Location: Joint BioEnergy Institute.
Position: Biochemist Project Scientist/Engineer
Research: Development of novel targeted analytical strategies for the quantification of primary and secondary metabolites to identify and overcome potential bottlenecks in the metabolic reaction network in order to enhance biofuel production.
- 2009–2011 **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**
Location: Joint BioEnergy Institute.
Position: Biochemist Project Scientist/Engineer
Research: Profiling metabolites and metabolic fluxes in microbes of ENIGMA-DOE interest, to understand how changes in metabolism influence cellular function.
- 2008–2009 **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**
Location: Joint BioEnergy Institute.
Position: Project Scientist/Engineer
Research: The development of novel targeted analytical strategies for the measurement of primary and secondary metabolites to identify and overcome potential bottlenecks in the metabolic reaction network in order to enhance biofuel production.
- 2007–2008 **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**
Locations: 2007-2008 at the Berkeley Center for Synthetic Biology; 2008 at the Joint BioEnergy Institute.
Position: Postdoctoral Fellow
Research: Development of metabolite assays for the purpose of studying metabolic pathways in *Desulfovibrio vulgaris* Hildenborough, a proposed candidate for the bioremediation of heavy metals and radio-nuclides.
- 2006–2007 **University of California, Berkeley, CA, USA**
Location: Berkeley Center for Synthetic Biology.

Position: Postdoctoral Fellow

Project: Development of metabolite assays for the purpose of studying metabolic pathways in *Desulfovibrio vulgaris* Hildenborough, a proposed candidate for the bioremediation of heavy metals and radio-nuclides.

2004–2006 **Lawrence Berkeley National Laboratory, Berkeley, CA, USA**

Locations: 2004-2005 at UC Berkeley; 2005-2006 at Berkeley Center for Synthetic Biology.

Position: Postdoctoral Fellow

Project: Development of metabolite assays for the purpose of studying metabolic pathways in *Desulfovibrio vulgaris* Hildenborough, a proposed candidate for the bioremediation of heavy metals and radio-nuclides.

EDUCATION

1999–2003 **Sheffield Hallam University, UK.**

Degree: Ph.D in Analytical Chemistry

Project: Determination of nicotine and its metabolites by Capillary Electrophoresis and Mass Spectrometry.

1998-1999 **University of Wolverhampton, UK.**

Degree: M.Sc in Biomedical Sciences

1995-1998 **University of Wolverhampton, UK.**

Degree: B.Sc (Hon's) Biochemistry

CONFERENCE PRESENTATIONS

1. [Baidoo EEK](#). Targeted metabolomics as a tool for understanding mevalonate pathway regulation in *E. coli*. Synthetic Biology UK conference, Edinburgh, UK, November 2016. Invited talk.
2. [Baidoo EEK](#), Wang G, Keasling JD. Overcoming the analytical challenge of analyzing Intermediates of Isoprenoid Biosynthesis in *Escherichia coli*. 11th International Conference of the Metabolomics Society, Burlingame, CA, USA, June 2015.
3. [Baidoo EEK](#), Wang G, Alonso-Gutierrez J, Joshua C, Nowroozi F, Lee TS, Keasling JD. Rapid analysis of intermediates of Isoprenoid Biosynthesis in *E. coli* by HILIC-TOF MS. American Society for Microbiology Boston, MA, USA, May 2014.
4. Bokinsky G, [Baidoo E](#), Burd H, Juminaga H, Keasling H. The off switch of E coli: Physiology of persister cells determined by post-translational regulatory cascade. American Society for Microbiology, San Francisco, CA, USA, June 2012.
5. [Baidoo EEK](#), Yilmaz S, Geller J, Hazen TC, Singh AK, Keasling JD. Differential analysis of metabolic intermediates from *Desulfovibrio vulgaris* Hildenborough and *Methanococcus maripaludis* under syntrophic growth conditions. American Society for Microbiology, San Francisco, CA, USA, June 2012.
6. Chiniquy D, Sharma V, Carroll A, [Baidoo E](#), Schultink A, Pauly M, Scheller H, Ronald P. Inactivation of Xylan Arabinosyl β -1,2-XylosylTransferase (XAXT1) in rice leads to decreased ferulic acid and increased saccharification. Phytochemical society of North America 50th Anniversary meeting, December 2011, Hawaii.
7. Sharma V, Chiniquy D, [Baidoo E](#), Keasling J, Ronald P, Scheller HV. Tools for developing glycosyltransferase assays and methods for xylan profiling in plants. Phytochemical society of North America 50th Anniversary meeting, December 2011, Hawaii.
8. Price MN, Tang YJ, Benke PI, [Baidoo EE](#), Chhabra SR, Stolyar SM, Fok O-Y, Myers S, Dehal PS, Mukhopadhyay A, Zane GM, Wall JD, Keasling JD, Arkin AP. Identification of Amino Acid Synthesis Pathways in *Desulfovibrio vulgaris* by Isotopic Labeling, Metabolite Analysis, and Genome Sequence Analysis. 108th General Meeting of the American Society for Microbiology, Boston, MA, USA, June 2008.

9. Baidoo EE, Benke PI, Villa S, Mukhopadhyay A, Keasling JD. American Society for Microbiology (Toronto, Canada). Study of selected amino acid biosynthetic pathways in the sulfate reducing bacterium *Desulfovibrio vulgaris* Hildenborough. 107th General Meeting of the American-Society-for-Microbiology, Toronto, CANADA, May 2007.
10. Shui W, Tang YJ, Baidoo E, Benke P, Rodriuez S, Chu J, Bertozzi C, Keasling JD. Determination of culture phase-dependent metabolic shift in *Mycobacter* by CE-MS and GC-MS. 107th General Meeting of the American-Society-for-Microbiology, Toronto, CANADA, May 2007.
11. Mukhopadhyay A, He Z, Alm E, Arkin A, Baidoo E, Borglin S, Borglin S, Chen W, Hazen T, He Q, Holman H-Y, Huang K, Joyner D, Keller M, Oeller P, Redding A, Sun J, Wall J, Wei J, Yen H-C, Zhou J, Keasling J. Salt stress in *Desulfovibrio vulgaris* hildenborough: An integrated genomics approach. 106th General Meeting of the American-Society-for-Microbiology, Orlando, FL, USA, May 2006.
12. Mahendra S, Petzold CJ, Baidoo EE; Keasling JD, Alvarez-Cohen L. Identification of the intermediates of in vivo 1,4-dioxane oxidation by monooxygenase enzymes. 106th General Meeting of the American-Society-for-Microbiology, Orlando, FL, USA, May 2006.
13. Baidoo EE, Witt M, Neusüß C, Pelzing M, VillaS, Kruppa G, Pingitore F, Leary JA, Keasling JD. High Resolution Mass Spectrometry in combination with Capillary Electrophoresis as a tool for Metabolome Research. 53rd Annual American Society for Mass Spectrometry Conference, San Antonio, TX, USA, June 2005.
14. Baidoo E, Smith RF, Clench MR, Tetler L. In-vitro study of placental metabolism of nicotine via beWo cell lines. 51st Annual American Society for Mass Spectrometry Conference, Montreal, Jun 2003.
15. Baidoo E, Smith RF, Clench MR, Tetler L. Clench and Lee Tetler. The determination of nicotine and its metabolites, in urine, by solid phase extraction and capillary electrophoresis/mass spectrometry. Royal Society of Chemistry, Kingston University, UK, July 2002.
16. Baidoo E, Smith RF, Clench MR, Tetler L. Clench and Lee Tetler. Analysis of metabolites of nicotine by CE-MS. British Mass Spectrometry Society LCMS Symposium, Cambridge University, UK, December 2001.

PUBLICATIONS

1. Chubukov V, Desmarais JJ, Wang G, Chan LJG, Baidoo EEK, Petzold CJ, Keasling JD, Mukhopadhyay A (2017) Engineering glucose metabolism of *Escherichia coli* under nitrogen starvation. *Npj Systems Biology and Applications*. doi:10.1038/npjbsa.2016.35
2. Zhang J, Kao E, Wang G, Baidoo EEK, Chen M, Keasling JD (2016) Metabolic engineering of *Escherichia coli* for the biosynthesis of 2-pyrrolidone. *Metab. Eng. Com.* **3**: 1-7.
3. Kirby J, Dietzel KL, Wichmann G, Chan R, Antipov E, Moss N, Baidoo EEK, Jackson P, Gaucher SP, Gottlieb S, LaBarge J, Mahatdejkul T, Hawkins KM, Muley S, Newman JD, Liu P, Keasling JD, Zhao L (2016) Engineering a functional 1-deoxy-D-xylulose 5-phosphate (DXP) pathway in *Saccharomyces cerevisiae*. *Metab. Eng.* **38**: 494-503.
4. Fang L, Ishikawa T, Rennie EA, Murawska GM, Lao J, Yan J, Tsai AYL, Baidoo EEK, Xu J, Keasling JD, Demura T, Kawai-Yamada M, Scheller HV, Mortimer JC (2016) Loss of Inositol Phosphorylceramide Sphingolipid Mannosylation Induces Plant Immune Responses and Reduces Cellulose Content in *Arabidopsis*. *The Plant Cell*.
5. Eudes A, Mouille M, Robinson DS, Benites VT, Wang G, Roux L, Tsai Y-L, Baidoo EEK, Chiu T-Y, Heazlewood JL, Scheller HV, Mukhopadhyay A, Keasling JD, Deutsch S, Loqué D (2016) Exploiting members of the BAHD acyltransferase family to synthesize multiple hydroxycinnamate and benzoate conjugates in yeast. *Microb. Cell Fact.* **15**: 198.
6. Hollinshead WD, Rodriguez S, Garcia Martin H, Wang G, Baidoo EEK, Sale KL, Keasling JD, Mukhopadhyay A, Tang YJ (2016) Examining *Escherichia coli* glycolytic pathways, catabolite repression, and metabolite channeling using Δ pfk mutants. *Biotechnol. Biofuels.* **9**: 212

7. Yuzawa S, Deng K, Wang, [Baidoo EEK](#), Northen TR, Adams PD, Katz L, Keasling JD (2016) Comprehensive In Vitro Analysis of Acyltransferase Domain Exchanges in Modular Polyketide Synthases and Its Application for Short-Chain Ketone Production. *ACS Syn. Bio.*
8. Tartaglio V, Rennie EA, Cahoon R, Wang G, [Baidoo E](#), Mortimer JC, Cahoon EB, Scheller HV (2016) Glycosylation of inositol phosphorylceramide sphingolipids is required for normal growth and reproduction in Arabidopsis. *Plant J.*
9. Brunk E, George KW, Alonso-Gutierrez J, Thompson M, [Baidoo E](#), Wang G, Petzold CJ, McCloskey D, Monk J, Yang L, O'Brien EJ, Batth TS, Garcia Martin H, Feist A, Adams PD, Keasling JD, Palsson BO, Lee TS (2016) Characterizing Strain Variation in Engineered *E. coli* Using a Multi-Omics-Based Workflow. *Cell Systems.* 2:335-346.
10. Kang A, George KW, Wang G, [Baidoo E](#), Keasling JD, Lee TS (2016) Isopentenyl diphosphate (IPP)-bypass mevalonate pathways for isopentenol production. *Metab. Eng.* 34: 25-35.
11. Eng CH, Yuzawa S, Wang G, [Baidoo EEK](#), Katz L, Keasling JD (2016) Alteration of Polyketide Stereochemistry from anti to syn by a Ketoreductase Domain Exchange in a Type I Modular Polyketide Synthase Subunit. *Biochem.* 55: 1677-1680.
12. Rodriguez S, Denby CM, Vu T, [Baidoo EEK](#), Wang G, Keasling JD (2016) ATP citrate lyase mediated cytosolic acetyl-CoA biosynthesis increases mevalonate production in *Saccharomyces cerevisiae*. *Microb. Cell Fact.* 15:1.
13. Eudes A, Pereira JH, Yogiswara S, Wang G, Teixeira Benites V, [Baidoo EEK](#), Lee TS, Adams PD, Keasling JD, Loqué D (2016) Exploiting the Substrate Promiscuity of Hydroxycinnamoyl-CoA: Shikimate Hydroxycinnamoyl Transferase to Reduce Lignin. *Plant Cell Phys.* 57: 568-579.
14. Zhang J, Kao E, Wang G, [Baidoo EEK](#), Chen M, Keasling JD (2016) Metabolic engineering of *Escherichia coli* for the biosynthesis of 2-pyrrolidone. *Metab. Eng. Comm.* 3: 1-7.
15. Kang A, George KW, Wang G, [Baidoo E](#), Keasling JD, Lee TS (2016) Isopentenyl diphosphate (IPP)-bypass mevalonate pathways for isopentenol production. *Metab. Eng.* 34: 25-35.
16. Ghosh A, Ando D, Gin J, Runguphan W, Denby C, Wang G, [Baidoo EEK](#), Shymansky C, Keasling JD, García Martín H (2016) ¹³C Metabolic Flux Analysis for Systematic Metabolic Engineering of *S. cerevisiae* for Overproduction of Fatty Acids. *Frontiers in Bioengineering and Biotechnology.* 4.
17. Eudes A, Zhao N, Sathitsuksanoh N, [Baidoo EEK](#), Lao J, Wang G, Yogiswara S, Lee TS, Singh S, Mortimer JC, Keasling JD, Simmons BA, Loqué D (2016) Expression of s-adenosylmethionine hydrolase in Tissues synthesizing secondary cell Walls alters specific Methylated cell Wall Fractions and improves Biomass Digestibility. *Frontiers in Bioengineering and Biotechnology.* 4.
18. Eudes A, Sathitsuksanoh N, [Baidoo EEK](#), George A, Liang Y, Yang F, Singh S, Keasling JD, Simmons BA, Loqué D (2015) Expression of a bacterial 3-dehydroshikimate dehydratase reduces lignin content and improves biomass saccharification efficiency. *Plant Biotechnol. J.* 13: 1241-1250
19. Eudes A, Teixeira Benites V, Wang G, [Baidoo EEK](#), Lee TS, Keasling JD, Loqué D (2015) Precursor-directed combinatorial biosynthesis of cinnamoyl, dihydrocinnamoyl, and benzoyl anthranilates in *saccharomyces cerevisiae*. *PLoS one.* 10: e0138972.
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21. Kent MS, Avina IC, Rader N, Busse ML, George A, Sathitsuksanoh N, [Baidoo E](#), Timlin J, Giron NH, Celina MC, Martin LE, Polsky R, Chavez VH, Huber DL, Keasling JD, Singh S, Simmons BA, Sale KL (2015) Assay for lignin breakdown based on lignin films: insights into the Fenton reaction with insoluble lignin. *Green Chem.* 17: 4830-4845.
22. George KW, Thompson MG, Kang A, [Baidoo E](#), Wang G, Chan LJG, Adams PD, Petzold CJ, Keasling JD, Lee TS (2015) Metabolic engineering for the high-yield production of isoprenoid-based C5 alcohols in *E. coli*. *Scientific Reports (Nature).* 5.

23. Walley J, Xiao Y, Wang J-Z, Baidoo EE, Keasling JD, Shen Z, Briggs SP, Dehesh K (2015) Plastid-produced interorgannellar stress signal MECPP potentiates induction of the unfolded protein response in endoplasmic reticulum. *PNAS*. **112**: 6212 – 6217
24. Chubukov V, Mingardon F, Schackwitz W, Baidoo EEK, Alonso-Gutierrez J, Hu Q, Lee TS, Keasling JD, Mukhopadhyay A (2015) Acute limonene toxicity in *Escherichia coli* is caused by limonene-hydroperoxide and alleviated by a point mutation in alkyl hydroperoxidase (AhpC). *App. Environ. Microbiol.* **81**:4690-4696.
25. Vega-Sánchez ME, Loqué D, Lao J, Catena M, Verhertbruggen Y, Herter T, Yang F, Harholt J, Ebert B, Baidoo EEK, Keasling JD, Scheller HV, Heazlewood JL, Ronald PC (2015) Engineering temporal accumulation of a low recalcitrance polysaccharide leads to increased C6 sugar content in plant cell walls. *Plant Biotechnol. J.* **13**: 903-914.
26. Kirby J, Nishimoto M, Chow RW, Baidoo EEK, Wang G, Martin J, Schackwitz W, Chan R, Fortman JL, Keasling JD (2015) Enhancing terpene yield from sugars via novel routes to 1-deoxy-d-xylulose 5-phosphate. *Appl. Environ. Microbiol.* **81**: 130-138.
27. Weaver LJ, Sousa MML, Wang G, Baidoo E, Petzold CJ, Keasling JD (2015) A kinetic-based approach to understanding heterologous mevalonate pathway function in *E. coli*. *Biotechnol. Bioeng.* **112**: 111-119.
28. Eudes A, Sathitsuksanoh N, Baidoo EEK, George A, Liang Y, Yang F, Sing S, Keasling JD, Simmons BA, Loqué D (2014) Expression of bacterial 3-dehydroshikimate dehydratase reduces lignin content and improves biomass saccharification efficiency. *Plant Biotechnol. J.* **13**: 1241-1250.
29. Goh EB, Baidoo EEK, Burd H, Lee TS, Keasling JD, Beller HR (2014) Substantial improvements in methyl ketone production in *E. coli* and insights on the pathway from in vitro studies. *Metab. Eng.* **26**: 67-76.
30. George KW, Chen A, Batth TS, Baidoo EEK, Wang G, Adams PD, Petzold CJ, Keasling JD, Lee TS (2014) Correlation analysis of targeted proteins and metabolites to assess and engineer microbial isopentenol production. *Biotech. Bioeng.* **111**: 1648-1658.
31. Ito J, Herter T, Baidoo EEK, Lao J, Vega-Sánchez M, Smith-Moritz, Adams PD, Keasling JD, Usadel B, Petzold CJ, Heazlewood J (2014) Analysis of plant nucleotide sugars by hydrophilic interaction liquid chromatography and tandem mass spectrometry. *Anal. Biochem.* **448**: 14-22.
32. Eudes A, Juminaga D, Baidoo EEK, Collins FW, Keasling JD, Loqué D. Erratum to: Production of hydroxycinnamoyl anthranilates from glucose in *Escherichia coli*. *Microbial Cell Factories*. 2014. 13.
33. Baidoo EEK, Xiao Y, Dehesh K, Keasling JD (2014) Metabolite profiling of Plastidial Deoxyxylulose-5-phosphate pathway intermediates by liquid chromatography and mass spectrometry (Chapter 5). *Plant Isoprenoids: Methods in Molecular Biology*. Humana Press Inc., Manuel Rodríguez-Concepción (Editor), **1153**: 57-76.
34. Nowroozi FF, Baidoo EEK, Ermakov S, Redding-Johanson AM, Batth TS, Petzold CJ, Keasling JD (2014) Metabolic pathway optimization using ribosome binding site variants and combinatorial gene assembly. *App. Microbiol. Biot.* **98**: 1567-1581.
35. Rajeev L, Luning EG, Altenburg S, Zane GM, Baidoo EEK, Catena M, Keasling JD, Wall JD, Fields MW, Mukhopadhyay A (2014) Identification of a cyclic-di-GMP-modulating response regulator that impacts biofilm formation in a model sulfate reducing bacterium. *Frontiers in Microbiology*. **5**:1-13.
36. Dhal RH, Zhang F, Alonso-Gutierrez J, Baidoo E, Baath TS, Redding-Johanson AM, Petzold CJ, Mukhopadhyay A, Lee TS, Adams P, Keasling JD (2013) Engineering dynamic pathway regulation using stress-response promoters. *Nat. Biotech.* **31**: 1039-1046.
37. Bokinsky G, Baidoo EEK, Akella S, Burd H, Weaver D, Alonso-Gutierrez J, García-Martín H, Lee TS, Keasling JD (2013) HipA-Triggered Growth Arrest and β -Lactam Tolerance in *Escherichia coli* Are Mediated by RelA-Dependent ppGpp Synthesis. *J. Bact.* **195**: 3173-3182.
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39. Zhou A, [Baidoo E](#), He Z, Mukhopadhyay A, Baumohl JK, Benke P, Joachimiak MP, Xie M, Song R, Arkin AP, Hazen TC, Keasling JD, Wall JD, Stahl DA, Zhou J (2013) Characterization of NaCl tolerance in *Desulfovibrio vulgaris* Hildenborough through experimental evolution. *ISME*. 1-13.
40. Boutigny S, Saini A, [Baidoo EEK](#), Yeung N, Keasling JD, Butland G (2013) Physical and Functional Interactions of a Monothiol Glutaredoxin and an Iron Sulfur Cluster Carrier Protein with the Sulfur-Donating Radical S-adenosyl-L-methionine Enzyme MiaB. *J. Biol. Chem.* **288**: 14200-14211.
41. Gille S, Sharma V, [Baidoo EEK](#), Keasling JD, Scheller HV, Pauly M (2013) Arabinosylation of a Yarrowia Precipitable Cell Wall Polymer Impacts Plant Growth as Exemplified by the Arabidopsis Glycosyltransferase Mutant ray1. *Mol. Plant.* **6**: 1369-1372.
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43. Rennie E, Hansen F, [Baidoo E](#), Hadi M, Keasling JD, Scheller H (2012) Three members of the Arabidopsis glycosyltransferase family 8 are xylan glucuronosyltransferases. *Plant Physiol.* **159**: 1408-1417.
44. McKee AE, Rutherford BJ, Chivian DC, [Baidoo EK](#) et al (2012) Manipulation of the carbon storage regulator system for metabolite remodeling and biofuels production in *Escherichia coli* (2012) *Microb. Cell Fact.* **11**.
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46. Chiniquy D, Sharma V, Carroll A, [Baidoo E](#), Schultink A, Harholt J, Pauly M, Keasling J, Scheller HV, Ronald P (2012) XAXT1, from glycosyltransferase family 61 mediates xylosyltransfer to rice xylan. *PNAS*. **109**: 17117-17122.
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48. [Baidoo EEK](#), Benke PI, Keasling JD (2012) Mass Spectrometry-based Microbial Metabolomics (Chapter 9). *Microbial Systems Biology: Methods and Protocols*. Series: Methods in Molecular Biology. Humana Press Inc., Ali Navid (Editor), **881**.
49. Rautengarten C, Ebert B, Ouellet M, Nafisi M, [Baidoo EEK](#), Benke PI, Keasling JD, Sakuragi Y, and Scheller HV (2012) The Arabidopsis Deficient in Cutin Ferulate Encodes A Transferase Required for Ferulylation of ω -Hydroxyfatty Acids in Cutin Polyester. *Plant Physiol.* **158**: 654-665.
50. Goh E-b, [Baidoo EEK](#), Keasling JK, Beller HR (2012) Engineering of bacterial methyl ketone synthesis for biofuels. *Appl. Environ. Microbiol.* **78**: 70-80.
51. Juminaga D, [Baidoo EE](#), Redding-Johanson AM, et al. (2012) Modular Engineering of L-Tyrosine Production in *Escherichia coli*. *Appl. Environ. Microbiol.* **78**: 89-98.
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53. Eudes A, [Baidoo EEK](#), Yang F, et al. (2011) Production of tranilast [N-(3',4'-dimethoxycinnamoyl)-anthranilic acid] and its analogs in yeast *Saccharomyces cerevisiae*. *Appl. Microbiol. Biotechnol.* **89**: 989-1000.
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REFERENCES

Professor Malcolm R. Clench
Professor of mass spectrometry
Biomedical Research Centre
Sheffield Hallam University
Howard Street
Sheffield
S1 1WB
United Kingdom
Tel: +44 (0)114225) 3054
m.r.clench@shu.ac.uk

Dr. Leonard Katz
Director of Research &
Industry Relations
Synthetic Biology Engineering
Research Center
EmeryStation East
5885 Hollis St., 4th Floor
Emeryville, CA 94608, USA
Tel: (510)486-5085
katzl@berkeley.edu

Professor Jay D. Keasling
CEO, Joint BioEnergy Institute
Lawrence Berkeley National
Laboratory
5885 Hollis St., 4th Floor
Emeryville, CA 94608, USA
Prof. Keasling: (510)495-2620
Olga Diaz: (510)486-5462
Susan Gardner (510)495-2764
keasling@berkeley.edu
jdkeasling@lbl.gov